

EXTERNAL REVIEW
OF THE
COOPERATIVE INSTITUTE for MARINE and ATMOSPHERIC STUDIES
(CIMAS)

REVIEW PANEL MEMBERS

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Executive Summary

An external review of the strategic plan, science review, education/outreach and science management programs of the Cooperative Institute for Marine and Atmospheric Studies (CIMAS) at the Rosenstiel School for Marine and Atmospheric Sciences (RSMAS) of the University of Miami was conducted on September 18 and 19, 2014 in Miami, FL. Guidelines for conducting the review were provided by the Cooperative Institute Program Office within the National Oceanic and Atmospheric Administration's (NOAA) Office of Oceanic and Atmospheric Research (OAR). The review was conducted under the auspices of the NOAA Science Advisory Board (SAB) and, therefore, is subject to the requirements of the Federal Advisory Committee Act (FACA). A list of review panel members is provided in Appendix I. The review panel's on-site agenda is provided in Appendix II.

The review panel found the CIMAS research programs benefit NOAA substantially from the outstanding collaborative efforts directed by the leadership team of Drs. Peter Ortner, Director and David Die, Associate Director. CIMAS includes major Florida universities as well as two U.S. Caribbean universities involved in marine and atmospheric science research. CIMAS benefits from the relationship/opportunity the leadership and research investigators have to closely collaborate with a number of local NOAA facilities. There are two co-located NOAA laboratories on Virginia Key: the Atlantic Oceanographic and Meteorological Laboratory (AOML) and the Southeast Fisheries Science Center (SFSC). Also, the National Hurricane Center (NHC) is nearby. This allows CIMAS staff to serve as Principal Investigators and work closely with federal colleagues to actively collaborate in planning research and transition to operations.

University support for CIMAS has progressed over time, and was well documented in the materials provided to the review team. CIMAS' stature as a non-academic division at UM allows some faculty to serve as fellows with administrators serving on the Board of Directors. CIMAS serves as a catalyst for outstanding scientific exchange between university and NOAA scientists.

I. Overview of CIMAS

Originally formed in 1977, CIMAS is one of the oldest and largest of the NOAA Cooperative Institutes (CIs). CIMAS is sponsored jointly by the University of Miami (UM) and the National Ocean and Atmospheric Administration (NOAA) specifically through NOAA's Office of Oceanic and Atmospheric Research (OAR). Still hosted by UM in 2010 under a new cooperative agreement with NOAA, CIMAS was expanded and now includes: Florida Atlantic University, Florida International University, Florida State University, Nova Southeastern University, University of Florida, University of South Florida, University of the Virgin Islands, and University of Puerto Rico. CIMAS is a strong partner with several NOAA facilities and a variety of programs in multiple line offices.

CIMAS, in response to NOAA's request for proposals (RFP), carries out and supports research and education/outreach services addressing seven scientific themes: Climate Research and Impact, Tropical Weather, Sustained Ocean and Coastal Observations, Ocean Modeling, Ecosystem Modeling and Forecasting, Ecosystem Management, and Protection and Restoration of Resources. Under the cooperative agreement between NOAA and UM, CIMAS research includes near real time forecasts and predictions. No research funds are allocated to CIMAS that are not specifically tied to an existing NOAA research project. While CIMAS is

currently financially sound, it has no discretionary funds from NOAA to allow for independent research in response to new opportunities or “bright ideas”.

II. CIMAS Strategic Plan

Science at NOAA is the systematic study of the structure and behavior of the ocean, atmosphere, and related ecosystems; integration of research and analysis; observations and monitoring; and environmental modeling.

Stewardship is NOAA’s direct use of its knowledge to protect people and the environment, as the Agency exercises its direct authority to regulate and sustain marine fisheries and their ecosystems, protect endangered marine and anadromous species, protect and restore habitats and ecosystems, conserve marine sanctuaries and other protected places, respond to environmental emergencies, and aid in disaster recovery.

Service is the communication of NOAA’s research, data, information, and knowledge for use by the Nation’s businesses, communities, and people’s daily lives. NOAA services include climate predictions and projections; weather and water reports, forecasts and warnings; nautical charts and navigational information; and the continuous delivery of a range of Earth observations and scientific data sets for use by public, private, and academic sectors.

Finding: The presentations given by CIMAS/RSMAS researchers and scientists made it clear the physical oceanography and climate science efforts are both cutting edge science and applied research. Study results improve knowledge of ocean physics, and how the physics may change in response to climate.

Finding: CIMAS is actively working to advance modeling of tropical cyclones, prediction of cyclone genesis, and improving hurricane intensity prediction, as well research related to ocean acidification, among others. The relationship between NHC and CIMAS was very impressive and may be even more important in the future given the diminishing federal funds to support research.

Finding: The panel felt that information about conservation and management of ecosystems, as presented, was much less cohesive, thus making it difficult to determine whether CIMAS activities were contributing largely to NOAA’s overall mission, especially in the biological context.

Finding: Based upon review panel conversations with CIMAS collaborators, it is clear that the CIMAS has been an important vehicle for increasing diversity and training young scientists. And the synergism between CIMAS, NOAA, and in particular the AOML appears to have increased efficiency for all of these entities.

Finding: CIMAS has been very successful in the way it leverages funding for institutions and other collaborators. The panel cautions with regard to the future of this synergism, as the focus of research in CIMAS is now heavily weighted towards advance modeling of tropical cyclones, prediction of cyclone genesis, and improving hurricane intensity prediction, among others.

Recommendation: The panel recommends that planning should begin to prioritize the programs in CIMAS to prepare for inevitable decreases in federal funding

Recommendation: The panel suggests more attention should be given to outreach activities.

III. CIMAS Science Review

CIMAS consists of world class research teams under excellent leadership, and is very effective in the pursuit of research programs relevant to the seven themes specified by NOAA strategic plan. The diverse range of CIMAS research activities falls within three Groups: 1. Physical oceanography and climate; 2. Ecosystem and fisheries; 3. Tropical meteorology/hurricane studies. These research projects are producing impressive scientific results, leading to many peer reviewed publications co-authored by NOAA and academic scientists.

Finding: CIMAS activities in numerical model development and evaluation, in various Observing System Simulation Experiments (OSSE), as well as utilizing new observational technologies, is impressive.

Finding: CIMAS research products can have direct relevance to operational pursuits of societal importance, consistent with the NOAA mission.

Finding: CIMAS plays a practical role by providing the infrastructure for diverse and flexible teams of researchers, technical staff, post-doctoral and graduate students, as required by NOAA to meet its research goals.

Finding: CIMAS enables both nimble response to natural hazard events, as well as the ability to pursue developing research avenues relevant to NOAA's mission. This is particularly apparent in the AOML and CIMAS partnership, each with their unique talents and responsibilities. Together, the 'whole is greater than the sum of the parts'.

Finding: CIMAS, using a range of web-based and social media for communication, outreach and education, is increasing its activity in reaching out to the public, which is an essential activity of climate and ecosystem researchers.

Finding: CIMAS research has regional or phenomenological focuses, forming relatively coherent activities. For example, its ecosystem and fisheries efforts have a focus on the marine system off south Florida and of the Pulley Ridge. And researchers in tropical meteorology/hurricane studies are focused on improving the understanding of tropical storm physics, as required to improve prediction.

Recommendation: As current CIMAS research efforts mature and some move to an operational phase, follow-up research needs to be identified and phased into the project plans. In this way the operational products will gain continued upgrades based on new science, and CIMAS will take on a proactive role in identifying NOAA future research priorities.

Recommendation: The physical oceanography and climate programs, while consisting of meaningful components, seem to lack overarching coherence. An effort to prioritize global climate versus more locally-applicable research topics appropriate for CIMAS and consistent with AOML programs should be undertaken.

Recommendation: Consideration should be given to bringing in more collaborators from other institutions (e.g., members of other CIs) that have direct relevance to specific CIMAS research

group activities. A broader range of collaboration will benefit the CIMAS PI status in the community and strengthen their science program pursuits.

Recommendation: Revisit the assessment regarding the optimum balance of CIMAS and AOML research activities. While CIMAS offers a nimble response (e.g., natural hazards), AOML provides long-term stability that encourages operational phases.

IV. CIMAS Education/Outreach

Directed funding for the CIMAS mission “*To create and implement formal education and training programs creating the intellectual capital required by the present and future NOAA*” is restricted to limited Task I funding (7% of total CIMAS Task I). CIMAS Associate Director, David Die provides CIMAS fellowships that are primarily used for gap funding, leveraging on NOAA Sea Grant Population Dynamics Fellowships and NOAA Educational Partnership Program (EPP) Living Marine Resources Cooperative Science Center (LMRCSC) funding, the latter for which he serves as PI.

Members of the panel were not given a real sense of what is being done to engage the public at large in CIMAS research and projects. Clearly, Aquarius is an important asset, and the increase in its web presence is commendable. However the panel concluded that the overall outreach efforts have not been sufficient.

Finding: CIMAS leadership encourages investigators on Task III competitive and non-competitive proposals to involve education and outreach (including K-12). However, lacking discretionary funds for Education under Task I (which the panel realizes is true for most if not all NOAA cooperative institutes) means students are only supported if connected with specific CIMAS research projects and thus, selected by the PIs using their own project funds.

Finding: Most K-12 outreach was PI driven. Because the research of PIs inclined to do outreach was not based in the U.S., Florida students are not served in these ports-of call efforts thus unable to experience valuable opportunities.

Recommendation: The panel suggests that more CIMAS-directed support for graduate students like the Task III stock assessment education project at the University of South Florida should be proactively pursued.

Recommendation: As suggested in the 2003 CIMAS review, formal tracking of CIMAS-funded students would add documented credibility for enhancing Task I education support. CIMAS is urged to initiate a retrospective examination of the subsequent career paths of their funded graduate and undergraduate students.

Recommendation: CIMAS should explore novel/new funding mechanisms and partnerships for recruitment and support of students in subjects key to NOAA research and human resource needs. Offering incentives to funding sources and investigators who conduct outreach that educates and engages stakeholders and future students on the societal or economic value of CIMAS research is encouraged.

V. CIMAS Science Management

The panel is impressed with the quality and diversity of research done at CIMAS. There is some concern that CIMAS growth and science management is heavily dependent on the director's unique pedigree of research experiences (former director of AOML), law background, chair of the UNOLS (University-National Oceanographic Laboratory System) council and personal connections with Congressional delegations and industry partners. This has been a tremendous asset to CIMAS, but comes with some risk if/when that single strong pillar of support leaves CIMAS. Our science management recommendations attempt to address this.

CIMAS has established effective interactions with, and service to, a number of NOAA programs and resource managers. NOAA partners stated that CIMAS could contribute more in areas such as social science research. The review committee is impressed by the level of collegiality among the partners, as well as the excellent diversity in the PI and student levels of CIMAS science. CIMAS can come off as a NOAA "contractor" at times, often supported by supplementary funding as a significant portion of its financial portfolio. This is not necessarily a bad thing if managed correctly and both sides are happy with the arrangement. However, some concern is raised with how the NOAA supplement-driven science model could affect students if the supplemental funding suddenly dries up.

Finding: The scientific leadership of CIMAS is in great hands with Director Peter Ortnier. CIMAS is in excellent financial health; funding has more than tripled over the past decade.

Finding: CIMAS has demonstrated rapid and effective responses to environmental catastrophes in support of NOAA.

Finding: CIMAS is one of the few CI's that accords NOAA reduced indirect costs (IDC) on some Tasks, which represents a major contribution on the part of the UM to allow flexibility in letting CIMAS implement certain policies (awards, pay scales, benefits etc.). This keeps CIMAS employees working at NOAA facilities as comparable as possible to the FTE's on their research teams.

Finding: Upon renewal, the CIMAS management expressed a concern that it will be a challenge to handle the transition (financially) to implement an entirely new Cooperative Agreement given the spending constraints to use both the present (still existing) NOAA funding and new Cooperative Agreement funding.

Finding: None of the CIMAS resources are reserved for new opportunities/starts or 'bright ideas', as there is no discretionary research funding.

Finding: Changes in UM policy (or perhaps more rigorous implementation of existing policies) have complicated the ability to assist CIMAS employees in pursuing their doctoral studies at Rosenstiel School for Marine and Atmospheric Sciences.

Recommendation: More frequent use of the CIMAS Council of Fellows, whom have only met once over the past 3 years, to help better strategize the longer term research goals of CIMAS. Perhaps also set up a science advisory working group of younger PIs to help encourage external funding opportunities and better enable CIMAS scientist growth, recognition, independent research, and external collaborations.

Recommendation: Draft a “leadership transition” plan to help educate and guide future CIMAS management in the eventual “post-Ortner” era and/or transition period.

VI. Summary and Conclusions

Following a thorough review of the strategic planning, science program, education and outreach, and science management performed by CIMAS, the review panel finds a significant number of strengths. The ongoing and completed research by CIMAS scientists and their partners is impressive. The NOAA science partners clearly indicate they could not accomplish their goals without the support of this Cooperative Institute. CIMAS has considerable impact on research that addresses issues of national interest.

Under the present guidelines for a CI review, the review panel unanimously agreed to a performance rating of Outstanding. The review panel’s findings and recommendations are items presented for consideration by the CIMAS leadership.

Appendix 1.

Review Panel
Cooperative Institute for Marine and Atmospheric Studies (CIMAS)

[1] Jean May-Brett, Chairperson (Member of NOAA's Science Advisory Board)

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During her 25-years of classroom teaching Ms. May-Brett taught Earth Science, Environmental Science, and Mathematics to students in New York and Louisiana at the middle and high school levels. Before assuming her position at the LA Department of Education, Jean served as the Assistant Director of Educational Services at Louisiana Public Broadcasting. She was the Curriculum Director and Content Producer for two award winning video series - an environmental science for middle school students and a professional development series for classroom teachers. Ms. May-Brett is an officer in both the Louisiana Science Teachers Association and the Louisiana Association of Teachers of Mathematics. Jean is a past-president of the Southern Association of Marine Educators (SAME) and the National Marine Educators Association (NMEA). She has served on the Council for the National Science Teachers Association and the CGOM COSEE Management Council. Jean completed three terms on Louisiana's Environmental Education Commission.

[2] Arnold L. Gordon, Ph.D.

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Dr. Gordon is a field-going physical oceanographer, an observationalist. His research is directed at the ocean's stratification, circulation and mixing and its role in Earth's climate system. He studies the transfer of heat and freshwater within the ocean and between the ocean, cryosphere and atmosphere. He views the ocean as a global system, with specific attention to interocean exchange and to ventilation of the deep ocean interior through sea-air-ice interaction. Comparison and extension of observational data with model results are an increasingly important part of his research. Historically much of his research deals with the Southern Ocean, but research within the warmer waters of the Indonesian Seas, tropical North Pacific, Indian and Atlantic Oceans now compose most of his research program. Recently his focus has been on the role of the ocean mesoscale in the transfer of heat and freshwater to compensate for net sea-air flux. He tends to go to areas that have been neglected by the research community, but have the potential of being key players in the global system. Dr. Gordon earned his B.A. from

Herbert Lehman College (1961), his Ph.D. from Columbia University of the City of New York (1965), and a Sc.D. (*Honoris causa*) from the University of Cape Town (2005).

[3] Christopher Velden

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Chris Velden received a bachelor's degree in Natural Science and Geography in 1979, and a M.S. in atmospheric sciences from the University of Wisconsin (UW) in 1982. He presently holds a position of Senior Scientist at the Cooperative Institute for Meteorological Satellite Studies (CIMSS) at UW, where he also serves on the Science Advisory Council. Velden's research interests include satellite-based analysis of tropical cyclones, from which he received the distinguished UW Chancellor's Award for Excellence in Research in 2012. He has served on numerous National Research Council committees, including the Decadal Survey, as well as chaired the American Meteorological Society Scientific and Technological Activities Commission committees.

[4] James H. Cowan, Jr., Ph.D.

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Dr. Cowan is a Professor in the Department of Oceanography and Coastal Sciences and the Coastal Fisheries Institute at the Louisiana State University. Among many other professional activities, he has served on four National Research Council study committees and technical review panels concerning fisheries issues, resulting in the publication of two books, has served on the Ocean Sciences Division, Biological Oceanography and Arctic natural Sciences Review Panels for the National Science Foundation four times, and has served as a US delegate both to the International Council for the Exploration of the Sea (ICES) and the Pacific Marine Sciences Organization (PICES). He was Chairman of the Reef Fish Stock Assessment Panel (1992-2004) and is a member of the Standing Scientific and Statistical Committee (1993-present) for the Gulf of Mexico Fishery Management Council. He has served as President of the Early Life History Section, and on the Outstanding Chapter Award and Distinguished Service Award committees for the American Fisheries Society (AFS). In addition, he recently (2007) received an Award for Excellence in Fisheries Management from AFS. He has almost 20 years of experience conducting fisheries research in marine and estuarine ecosystems and on artificial reefs, has authored more than 100 refereed publications in the primary fisheries

literature, served as an associate editor for *Estuaries*, the journal of the Estuarine Research Federation, an associate editor for *Gulf of Mexico Science*, and as an associate editor for *Transactions of the American Fisheries Society*. He earned a B.S. in Biology (1976) and M.S. in Biological Oceanography from Old Dominion University (1981) and a M.S. in Experimental Statistics and Ph.D. in Marine Sciences from Louisiana State University (1985).

[5] Susan Sugai, Ph.D. (*Ex-Officio*, cooperative institute representative)

Director

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Dr. Susan Sugai is the Director of the Center for Global Change & Arctic System Research (CGC) at the University of Alaska Fairbanks, and Director of the NOAA Cooperative Institute for Alaska Research (CIFAR). As director of CGC, she mentors and provides competitive support to UAF students for interdisciplinary research related to global change with a focus on arctic or subarctic boreal regions. Undergraduate and graduate students gain experience with proposal writing and the peer review system as practiced by science funding agencies, and awardees are responsible for managing their research funds. Sugai's interests include the biogeochemistry of marine and lake sediments and taiga forest soils, and involving high school students from Alaska's rural villages in regional marine resource issues. Susan obtained a B.A. in chemistry from Oakland University in 1970, an M.S. in oceanography from University of Washington in 1975 and a Ph.D. in oceanography from University of Alaska in 1985. Prior to joining CGC and CIFAR, she was associate director of Alaska Sea Grant and a research scientist at the School of Fisheries and Ocean Sciences at UAF. From 2003 to 2008, she served as an academic representative to the United States Arctic Research Commission.

Appendix II.
Agenda for the Review of
Cooperative Institute for Marine and Atmospheric Studies (CIMAS)
Sept 18, 19 2014
CIMAS Building Third Floor

Day 1

0730-0745	Transportation from Hotel
0800-0830	Panel Executive Session (CIMAS Directors conference Room)
0830-0900	Continental Breakfast
0900-0915	Welcome from Dean or Provost
0915-1000	CIMAS Overview / Questions – Director
1000-1020	AM Coffee Break
1020-1200	20 min Presentations/Questions (5) – Group One
1200-1300	Panel Lunch with CIMAS Partners
1300-1440	20 min Presentations/Questions (5) – Groups One/Two
1440-1500	PM Coffee Break
1500-1640	20 min Presentations/Questions (4) – Group Two
1640-1715	Panel Executive Session (CIMAS Director's conference Room)
1715-1730	Transportation to Hotel

Day 2

0730-0745	Transportation from Hotel
0800-0830	Continental Breakfast CIMAS Conference Room
0830-1010	20 min Presentations/Questions (5) – Group Three
1010-1100	AM Coffee Break /interact with post docs/ grad students
1100-1200	Tour of new NIST Building (SUSTAIN and Marine Life Facilities)
1200-1300	Panel Lunch with NOAA CIMAS Users (Closed to CIMAS)
1300-1630	Panel Executive Session (CIMAS Directors conference Room)
1630-1700	Panel Report Out (CIMAS Conference Room)
1700-1715	Transportation to Hotel

**READAHEAD MATERIALS THAT WILL BE PROVIDED TO
THE PANEL**

1. Review Agenda
2. Cooperative Agreement/Accepted Proposal
3. Memorandum of Agreement
4. Most Recent Annual Report – also available CIMAS website along with prior ones since 2003
5. Participating Grad Student/Post Doc “Abstracts”
6. List of Partners and Users for Respective Lunch Sessions